

Claims

[c1] A semiconductor device comprising:

- a substrate;
- a buffer layer comprising GaN formed on the substrate, wherein surfaces of the buffer layer are c facets of Ga atoms;
- a channel layer comprising GaN or InGaN formed on the buffer layer, wherein surfaces of the channel layer are c facets of Ga or In atoms;
- an electron donor layer comprising AlGaN formed on the channel layer, wherein surfaces of the electron donor layer are c facets of Al or Ga atoms;
- a source electrode and a drain electrode formed on the electron donor layer;
- a cap layer comprising GaN or InGaAlN formed between the source electrode and the drain electrode, wherein surfaces of the cap layer are c facets of Ga or In atoms and at least a portion of the cap layer is in contact with the electron donor layer; and
- a gate electrode formed at least a portion of which is in contact with the cap layer, wherein the gate electrode is formed on the cap layer, and

wherein the gate electrode has a surface area which is larger than that of the cap layer.